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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,030	09/28/2001	Salil Prabhakar	D/A1093 XER 2 0433	4583

27885 7590 09/20/2005

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EXAMINER	
MENBERU, BENIYAM	
ART UNIT	**PAPER NUMBER**
2626	

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/966,030	PRABHAKAR ET AL.	
	Examiner	Art Unit	
	Beniyam Menberu	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☒ Claim(s) *24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/6/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments, see pages 8-13, filed May 11, 2005, with respect to the rejection(s)of claim(s) 1, 14, and 23 under U.S. Patent No. 5309228 to Nakamura, Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) in view of U.S. Patent No. 5309228 to Nakamura, and U.S. Patent No. 5309228 to Nakamura in view of United States Patent Application Publication No. US 2002/0146173 to Herley respectively have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 5222154 to Graham et al.

Claim Objections

2. Claim 24 is objected to because of the following informalities:

On page 7, line 3, "curves in each plane using are detected using" should be "curves in each plane are detected using".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 14, 23, 25, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5222154 to Graham et al.

Regarding claim 1, Graham et al disclose a method for detecting and segmenting sweeps in a graphics image, comprising the steps of:

a) detecting sweep segment information from one or more color channel histograms of the graphics image (column 3, lines 60-64; column 5, lines 57-68; column 6, lines 1-5); and

b) segmenting the graphics image into sweep and non-sweep areas using the sweep segment information (column 10, lines 13-68; column 11, lines 1-5; Graham et al disclose finding matching color areas which represent sweep areas and the unmatched colors represent non-sweep areas. The match criteria is based on the color tolerance value (column 10, lines 45-53).).

Regarding claim 3, Graham et al teach all the limitations of claim 1. Further Graham et al disclose the method as set forth in claim 1, step a) further including the steps:

c) transforming the graphics image to a three-dimensional histogram in color space (column 5, lines 57-64);

d) estimating two-dimensional histograms for each of the color channels from the three dimensional histogram (column 6, lines 55-68; column 7, lines 1-48; Figures 3B-3D); and

e) processing each of the two-dimensional histograms to detect sweep segment information (column 7, lines 1-48; column 8, lines 1-11).

Regarding claim 14, Graham et al disclose a method for detecting and segmenting sweeps in a graphics image, including the steps of:

a) transforming an input graphics image to a three-dimensional histogram in color space(column 5, lines 57-64);

b) estimating two-dimensional histograms for each of the color channels from the three-dimensional histogram(column 6, lines 55-68; column 7, lines 1-48; Figures 3B-3D);

c) processing each of the two-dimensional histograms to detect sweep segment information(column 7, lines 1-48; column 8, lines 1-11); and

d) segmenting the input graphics image into sweep and non-sweep areas using the sweep segment information (column 10, lines 13-68; column 11, lines 1-5; Graham et al disclose finding matching color areas which represent sweep areas and the unmatched colors represent non-sweep areas. The match criteria is based on the color tolerance value (column 10, lines 45-53)).

Regarding claim 23, Graham et al disclose a method for detecting and segmenting sweeps in a graphics image, including the steps of:

converting an input graphics image to a color space (column 5, lines 56-65; column 7, lines 9-14);

projecting the image represented in the color space to a plurality of planes (column 7, lines 9-24, lines 49-67);

detecting curves in each plane (column 7, lines 17-43);

identifying pixels of the color associated with each detected curve and storing such pixel information (column 9, lines 43-68; column 10, lines 1-44); and

combining the pixel information for each color to determine if pixels of that color are part of a sweep (column 10, lines 45-67).

Regarding claim 25, Graham et al teach all the limitations of claim 1. Further Graham et al disclose the method as set forth in claim 1, wherein the sweep area is an area of uniformly changing colors and a non-sweep area is an area of uniform colors (column 8, lines 33-50; column 10, lines 13-68; column 11, lines 1-5; Graham et al disclose finding matching color areas which represent sweep areas and the unmatched colors represent non-sweep areas. The match criteria is based on the color tolerance value (column 10, lines 45-53)).

Regarding claim 26, Graham et al teach all the limitations of claim 1. Further Graham et al disclose the method as set forth in claim 1, wherein the one or more color channel histograms include a plurality of colors (column 7, lines 9-15).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2, 4, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5222154 to Graham et al in view of Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998).

Regarding claim 2, Graham et al teaches all the limitations of claim 1. However Graham et al does not disclose the method as set forth in claim 1, wherein the color channel histograms of step a) are in CIELUV color space.

Shafarenko discloses using CIELUV color space for the histogram (column 2, lines 3-9).

Graham et al and Shafarenko are combinable because they are in the similar problem area of image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the color space selection of Shafarenko with the system of Graham et al to implement CIELUV color space based image segmentation.

The motivation to combine the reference is clear because Shafarenko teaches that the LUV color space is ideal for human vision system (page 1354, Introduction, first paragraph).

Regarding claim 4, Graham et al teach all the limitations of claim 3. Further Shafarenko disclose wherein the color space of step c) is CIELUV color space (Shafarenko: page 1355, column 1, second paragraph) and the color channels of step d) are color channels in the CIELUV color space (Shafarenko: page 1358, column 1, second paragraph).

Regarding claim 15, Graham et al teach all the limitations of claim 14. Further Shafarenko discloses the method as set forth in claim 14, wherein the color space of step a) is CIELUV color space and the color channels of step b) are color channels in the CIELUV color space (column 2, lines 3-9).

7. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5222154 to Graham et al in view of in view of U.S. Patent No. 6647131 to Bradski.

Regarding claim 5, Graham et al teach all the limitations of claim 3. However Graham et al does not disclose the method as set forth in claim 3, step d) further including the step: normalizing the two-dimensional histograms according to predetermined scaling scheme.

Bradski discloses the method as set forth in claim 3, step d) further including the step: normalizing the two-dimensional histograms according to predetermined scaling scheme (column 7, lines 42-48;column 8, lines 24-28).

Graham et al and Bradski are combinable because they are in the similar problem area of image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the histogram normalization taught by Bradski with the image segmentation system of Graham et al to implement image segmentation with histogram normalization.

The motivation to combine the reference is clear because normalization facilitates the computation of data.

Regarding claim 16, Graham et al teach all the limitations of claim 14. Further Bradski discloses

e) normalizing the two-dimensional histograms according to a predetermined scaling scheme (column 7, lines 42-48;column 8, lines 24-28).

8. Claims 6, 7, 8, 9, 10, 11, 12, 17, 18, 19, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5222154 to Graham et al in view of United States Patent Application Publication No. US 2002/0146173 to Herley.

Regarding claim 6, Graham et al teach all the limitations of claim 3. However Graham et al does not disclose the method as set forth in claim 3, step e) further including the steps:

f) detecting edges in each of the two-dimensional histograms to create corresponding edge maps ; and

g) performing a connectivity analysis of the edges in each of the edge maps.

Herley discloses the method as set forth in claim 3, step e) further including the steps:

f) detecting edges in each of the two-dimensional histograms to create corresponding edge maps (page 2, paragraph 17, lines 5-8, paragraph 18, lines 1-3, paragraph 21, lines 1-3), and

g) performing a connectivity analysis of the edges in each of the edge maps (page 2, paragraph 18).

Graham et al and Herley are combinable because they are in the similar problem area of image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the edge detection/analysis taught by Herley with the system of Graham et al to implement edge detection for image segmentation.

The motivation to combine the reference is clear because Herley uses edge detection for the detection of multiple objects in images (page 1, paragraph 5, lines 1-4).

Regarding claim 7, Graham et al in view of Herley teach all the limitations of claim 6. Further Herley discloses the method as set forth in claim 6, step e) further including the steps:

h) converting the detected edges in each of the edge maps to points in a Hough parametric space (page 2, paragraph 21, lines 1-3),

i) rendering lines from the Hough parametric space on the corresponding edge map (page 2, paragraph 21, lines 8-12), and

j) marking the overlap between the rendered lines and curves and the detected edges on each of the edge maps (page 2, paragraph 21, 5-12).

Regarding claim 8, Graham et al in view of Herley teach all the limitations of claim 7. Further Herley discloses the method as set forth in claim 7, step e) further including the steps:

k) identifying pairs of parallel line segments in each of the edge maps (page 2, paragraph 22, line 3-9);

l) computing the mid-segment of each pair of parallel line segments in each of the edge maps to complete detection of the sweep segment information for each two-dimensional histogram (page 3, paragraph 33., paragraph 37); and

m) combining the detected sweep segment information (page 3, paragraph 35).

Regarding claim 9, Graham et al teach all the limitations of claim 1. Further Herley discloses the step:

c) performing post-processing on the input graphics image to reject segmenting that falsely identified any non-sweep portion of the image as a sweep area and vice versa (page 3, paragraph 29-30).

Regarding claim 10, Graham et al in view of Herley teach all the limitations of claim 9. Further Herley discloses the method as set forth in claim 9, wherein the post-processing includes using a digital filter to reject small isolated areas of sweeps and non-sweeps (page 1, paragraph 16, page 3, paragraph 34, 36).

Regarding claim 11, Graham et al in view of Herley teach all the limitations of claim 9. Further Herley discloses the method as set forth in claim 9, wherein the post-processing includes computing gradient information and rejecting those sweep areas where the gradient in the image is less than a threshold (page 2, paragraph 18).

Regarding claim 12, Graham et al in view of Herley teach all the limitations of claim 11. Further Herley discloses the method as set forth in claim 11, wherein the post-processing includes computing gradient information at several scales (page 2, paragraph 18, lines 8-11).

Regarding claim 17, Graham et al teach all the limitations of claim 14. Further Herley disclose the method including:

e) detecting edges in each of the two-dimensional histograms to create corresponding edge maps(page 2, paragraph 17, lines 5-8; paragraph 18, lines 1-3, paragraph 21,lines 1-3);

f) performing a connectivity analysis of the edges in each of the edge map(page 2, paragraph 18);

g) converting the detected edges in each of the edge maps to points in a Hough parametric space(page 2, paragraph 21, lines 1-3);

h) rendering lines from the Hough parametric space on the corresponding edge map(page 2, paragraph 21, lines 8-12);

and

i) marking the overlap between the rendered lines and the detected edges on each of the edge maps(page 2, paragraph 21, 5-12).

Regarding claim 18, Graham et al in view of Herley teach all the limitations of claim 17. Further Herley disclose the method as set forth in claim 17, step c) further including the steps:

j) identifying pairs of parallel line segments in each of the edge maps(page 2, paragraph 22, line 3-9);

k) computing the mid-segment of each pair of parallel line segments in each of the edge maps to complete detection of the sweep segment information for each two-dimensional histogram(page 3, paragraph 33; paragraph 37); and

l) combining the detected sweep segment information (page 3, paragraph 35).

Regarding claim 19, Graham et al teach all the limitations of claim 14. Further Herley disclose the method as set forth in claim 14, further including the step:
e) performing post-processing on the input graphics image to reject segmenting that falsely identified any non-sweep portion of the image as a sweep area and vice versa(page 3, paragraph 29-30).

Regarding claim 20, Graham et al in view of Herley teach all the limitations of claim 19. Further Herley disclose the method as set forth in claim 19, wherein the post-processing includes using a digital filter to reject small isolated areas of sweeps and non-sweeps (page 1, paragraph 16; page 3, paragraph 34, 36).

Regarding claim 21, Graham et al in view of Herley teach all the limitations of claim 19. Further Herley disclose the method as set forth in claim 19, wherein the post-processing includes computing gradient information and rejecting those sweep areas where the gradient in the image is less than a threshold (page 2, paragraph 18).

9. Claims 13, 22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5222154 to Graham et al in view of United States Patent Application Publication No. US 2002/0146173 to Herley further in view of Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998).

Regarding claims 13 and 22, Graham et al in view of Herley teach all the limitations of claims 9. Herley discloses post-processing including rejecting segmenting due to horizontal lines (Herley: page 3, paragraph 34). However Herley does not disclose detection in the U and V color channels.

Shafarenko discloses the use of the LUV color channels (Shafarenko: column 2,

lines 3-9).

Graham et al, Herley, and Shafarenko are combinable because they are in the similar problem area of image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the post-processing of Herley and the LUV color channels of Shafaraenko to implement post-processing of image segmentation in the LUV color space.

The motivation to combine the reference is clear because Shafarenko teaches that the LUV color space is ideal for human vision system (page 1354, Introduction, first paragraph).

Regarding claim 24, Graham et al teach all the limitations of claim 23. Further Graham et al disclose pixels of the color associated with each detected curve are identified using a logical label; and the pixel information for each color is combined using a logical AND operation to determine if pixels of that color are part of a sweep (column 10, lines 36-65). Further Herley discloses :

the image represented in the color space is projected to three orthogonal planes(page 2, paragraph 19, lines 10-17);

curves in each plane using are detected using a Hough transform and edge linking(page 2, paragraph 21). Further Shafarenko discloses using CIELUV color space for color analysis (column 2, lines 3-9).

Other Prior Art Cited

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6721003 to Tsuruoka et al disclose image processor.

U.S. Patent Application Publication No. US 2004/0170321 A1 to Gong et al disclose method for segmentation, classification, and summarization of video images.

U.S. Patent Application Publication No. US 2003/0016864 to McGee et al disclose method and system for cartoon detection in video data.

U.S. Patent No. 5307182 to Maltz disclose color image processor.

U.S. Patent No. 6803920 to Gossett et al disclose method and apparatus for digital image segmentation.

U.S. Patent No. 6526169 to Murching et al disclose histogram based segmentation.

U.S. Patent No. 6535633 to Schweid et al disclose method and apparatus for reclassifying color image pixels.

U.S. Patent No. 6778698 to Prakash et al disclose digital image segmentation.

IEEE Transactions on Systems, Man, and Cybernetics, Vol. 22, No. 1, January/February 1992 to Healey disclose image segmentation.

U.S. Patent No. 6654055 to Park et al disclose color illumination detection.

U.S. Patent Application Publication No. US 2003/0044061 A1 to Prempraneerach et al disclose color image segmentation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (571) 272-7465. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (571) 272-7471. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (571) 272-2600. The group receptionist number for TC 2600 is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patent Examiner

Beniyam Menberu

BM

08/19/2005

KAWilliams

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